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EXAMINER

SCHINDLER, DAVID M

ART UNIT	PAPER NUMBER
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2862

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/821,913

Applicant(s)

SATO ET AL.

Examiner

David Schindler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 10/052,525.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 6/5/2006.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to the communication filed 6/19/2006.

Response to Arguments

2. Applicant's arguments filed 6/19/2006 have been fully considered but they are not persuasive.

With regard to the last paragraph of page 2 of the Remarks, the Examiner respectfully disagrees. With regard to the newly added "substantially square portion of a substrate", the Examiner notes that this particular feature appears to introduce new matter, in the combination. The Examiner notes that this particular feature has been added to independent claims 2 and 4. Given the disclosure, it appears that applicant is referring to applicant's Figure 42. Since Lines 23-34 of page 23 state that the magnetic sensor 60 has a rectangular (generally square) shape, the Examiner respectfully disagrees with applicant. With regard to the last two lines of page 2, and lines 1-2 of page 3, the Examiner respectfully disagrees. Note Lines 1-2 on page 20 of Adelerhof which discloses that the elements can be positioned on both sides of the substrate.

With regard to the first full paragraph of page 3 of the Remarks (herein referred to as "paragraph 1"), the Examiner respectfully disagrees. First, the Examiner notes that Figure 10 appears to disclose 8 elements. With regard to the symmetrical requirement of the amended claim 2, the Examiner notes that Figure 11 does disclose that the magnetoresistance effect elements are placed symmetrically with respect to perpendicular center lines of the portion (see for example the marked up Figure 11 provided in the previous Office Action about how the elements are symmetric about

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both the X and Y axis). With regard to lines 4-6 of paragraph 1, the Examiner respectfully notes that both Figure 10 and Figure 11 disclose at least 8 elements, and at least two full bridges. Note for example lines 10-17 of page 13 of Adelerhof which discloses a double Wheatstone Bridge. The Examiner notes that there appear to be two elements in the positive X direction, two elements in the negative X direction, and four elements in the positive Y direction in Figure 10. With regard to lines 6-9 of paragraph 1, the Examiner notes that these features do not appear to be claimed. With regard to lines 12-13 of paragraph 1, the Examiner respectfully disagrees and again notes that the two bridges in Figure 10 have been described as Wheatstone Bridges and are therefore each full bridges. With regard to lines 13-20, the Examiner respectfully disagrees. While applicant has pointed out Figure 7 and that Adelerhof discloses that the chips could be stacked together, the Examiner also notes that Adelerhof discloses that alternately the elements could be positioned at both sides of the substrate (lines 1-2 on page 20 of Adelerhof). Additionally note Figure 5. With regard to the last three lines of paragraph 1, as well as lines 1-2 of page 4 of the Remarks, the Examiner respectfully disagrees. Again note lines 23-24 of page 23 of applicant's specification which states that the magnetic sensor 60 has a rectangular (generally square) shape. The phrase "substantially square portion", in the combination, does not appear to be supported. In any event, it appears that a rectangular structure, according to the original disclosure, meets the claimed feature. The Examiner also notes that the claimed inventions merely disclose "a magnetic sensor comprising" the various features disclosed in the claims. Additionally, Adelerhof

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discloses Figure 5 as part of a magnetoresistive sensor device (last line of page 12 of Adelerhof), and discloses Figures 10 and 11 of Adelerhof are or are port of sensing systems (lines 10-20 of page 13 of Adelerhof).

3. **Note:** Due to the informal nature of the claims, an art rejection has not been provided for claim 3.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 2-6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As to Claim 2,

The phrase “substantially square portion of a substrate” (line 6) in combination with the phrase “said magnetoresistance effect elements are placed symmetrically with respect to perpendicular lines of the portion” on lines 14-16, appears to introduce new matter. It appears that applicant is referring to applicant’s Figure 42; however, the Examiner notes that applicant’s specification discloses that the magnetic sensor 60 has

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a rectangular (generally square) shape (lines 23-24 of page 23 of applicant's specification). Therefore the newly added feature does not appear to be supported.

As to Claim 4,

This claim stands rejected for a similar reason as noted in the above claim 2 rejection. This claim appears to be referring to Figure 42 in the disclosure; however, the Examiner notes that applicant's specification discloses that the magnetic sensor 60 has a rectangular (generally square) shape (lines 23-24 of page 23 of applicant's specification).

Also, each of the elements (a) through (h) appear to contain an additional instance of new matter. For example, feature (a) recites "said first element being formed in a lower left quadrant of the portion below and near the Y-axis and near the left side, and having a pinned magnetization direction of said first element's pinned layer in a direction of the X-axis" on lines 19-25 of claim 4. Using applicant's Figure 42, the Examiner note that only two elements appear to be in the lower left quadrant. These elements are (61) and (74). Only elements (61) appears to have a pinned magnetization direction in a direction of the X-axis. However, this element does not appear to be below or near the Y-axis. The other features of the claim appear to contain similar issues.

Lastly, the phrase "the portion having ... and perpendicular center lines" on lines 15-16" appears to add new matter as the square portion does not appear to have perpendicular center lines.

As to Claims 3, 5, and 6,

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These claims stand rejected for incorporating the above rejected subject matter.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 4-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to Claim 4,

It is not clear what applicant is attempting to claim with regard to features (a) through (h). Note the above 35 U.S.C. 112 first paragraph rejection of Claim 4.

As to Claims 5 and 6,

These claims stand rejected for incorporating the subject matter of the above rejected claim 4.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 2, and 4-8 are rejected under 35 U.S.C. 102(e) as being anticipated by ADELERHOF et al. (herein referred to as "ADELERHOF") (WO 00/79298).

As to Claim 2,

ADELERHOF discloses a magnetoresistance effect element including a spin valve film, the film including a free layer, a spacer layer, and a pinned layer whose magnetization direction is pinned, wherein the layers are successively laminated on a substantially square portion of a substrate of a chip, the magnetoresistance effect element having a resistance value that changes in accordance with a relative angle formed by the magnetization direction of the pinned layer and a magnetization direction of the free layer ((Page 1, Lines 9-29) and (Page 2, Lines 1-8) and (note Applicant's Specification, Page 1, Lines 20-28)), the magnetic sensor being formed in such a manner that a plurality of the magnetoresistance effect elements are provided on the substrate, the magnetoresistance effect elements are placed symmetrically with respect to perpendicular center lines of the portion, and the pinned layers of at least two of the plurality of magnetoresistance effect elements have the pinned magnetization directions that cross each other ((Page 1, Lines 9-11) and (Page 5, Lines 23-29) and (Page 13, Lines 10-20) and (Page 20, Lines 1-2) and (Figures 5, 10, and 11)).

With regard to the above center lines, note the symmetry about the X and Y axis of the marked up Figure 11 provided with the Office Action mailed 12/20/2005.

As to Claim 4,

ADELERHOF discloses a first through an eighth element (Figures 10 and 11), each of the elements including a spin valve film, the film including a free layer, a spacer layer, and a pinned layer, the pinned layer having a pinned magnetization direction, wherein each element has a resistance value that changes in accordance with a relative

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angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer ((Page 1, Lines 9-29) and (Page 2, Lines 1-8) and (note Applicant's Specification, Page 1, Lines 20-28)), the magnetic sensor being formed in such a manner that the magnetoresistance effect elements are provided on a substantially square portion of a substrate on a signal chip, the portion having left, right, top, and bottom sides, and perpendicular center lines on an X-axis and a Y-axis (Figures 10 and 11); (a) the first element (Examiner's Reference (1)) being formed in a lower left quadrant of the portion, below and near the Y-axis, and near the left side, and having a pinned magnetization direction of the first element's pinned layer in a direction of the X-axis; (b) the second element (Examiner's Reference (2)) being formed in an upper left quadrant of the portion, above and near the Y-axis, and near the left side, and having a pinned magnetization direction of the second element's pinned layer in the direction of the X-axis; (c) the third element (Examiner's Reference (3)) being formed in an upper right quadrant of the portion, above and near the Y-axis, and near the right side, and having a pinned magnetization direction of the third element's pinned layer in the direction of the X-axis; (d) the fourth element (Examiner's Reference (4)) being formed in a lower right quadrant of the portion, below and near the Y-axis and near the right side, and having a pinned magnetization direction of the fourth element's pinned layer in the direction of the X-axis; (e) the fifth element (Examiner's Reference (5)) being formed in the upper left quadrant of the portion, to the left of and near the X-axis, and near the top side, and having a pinned magnetization direction of the fifth element's pinned layer in the direction of the Y-axis; (f) the sixth element (Examiner's Reference

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(6)) being formed in the upper right quadrant of the portion, to the right of and near the X-axis and near the top side, and having a pinned magnetization direction of the sixth element's pinned layer in the direction of the Y-axis; (g) the seventh element (Examiner's Reference (7)) being formed in the lower right quadrant of the portion, to the right of and near the X-axis and near the bottom side, and having a pinned magnetization direction of the seventh element's pinned layer in the direction of the Y-axis; and (h) the eighth element (Examiner's Reference (8)) being formed in the lower left quadrant of the portion, to the left of and near the X-axis and near the bottom side, and having a pinned magnetization direction of the eighth element's pinned layer in the direction of the Y-axis ((Page 1, Lines 9-11) and (Page 5, Lines 23-29) and (Page 13, Lines 10-20) and (Page 20, Lines 1-2) and (Figures 5, 10, and 11)).

(With respect to the above Claim, Please note Figures 10 and 11, and Page 13, Lines 10-20. Note the direction of magnetization of the compact double Wheatstone bridge of Figure 10, and that Figure 11 has a matrix of compact double Wheatstone bridges. To assist in identifying what the Examiner is interpreting the different elements to be, the Examiner provided a marked up Figure 11 with the Office Action mailed 12/20/2005. Also note that the Examiner is interpreting the intersection of the X-axis and Y-axis to occur at the center of Figure 11. To illustrate this, the Examiner has drawn a line representing the Y-axis, and has used the dotted line running from left to right in the middle of the Figure as the X-axis. Finally, with respect to the elements (Examiner's reference (7) and (8)) in the negative Y-axis direction (such as the seventh and eighth element which appear to be representing (74) and (73) of Applicant's Figure

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42), please note the bridges that (8) and (7) are apart of are inverted to that which is shown in Figure 10. In this bridge, given the magnetization direction of disclosed in Figure 10, the magnetization direction of the top middle elements would be opposite to that shown in Figure 10.)

As to Claim 5,

ADELERHOF discloses the first to fourth elements construct an X-axis magnetic sensor for detecting a magnetic field in a X-axis direction by full bridge connection of the first to fourth elements (Figure 11 / note that each of the above elements are connected in a full bridge), and the fifth to eighth elements construct a Y-axis magnetic sensor for detecting a magnetic field in a Y-axis direction by full bridge connection of the fifth to eighth elements (Figure 11 / note that each of the above elements are connected in a full bridge).

As to Claim 6,

ADELERHOF discloses (a) the pinned magnetization direction of the pinned layer of the first and the second elements are in a negative direction of the X-axis; (b) the pinned magnetization direction of the pinned layer of the third and the fourth elements are in a positive direction of the X-axis; (c) the pinned magnetization direction of the pinned layer of the fifth and the sixth elements are in a positive direction of the Y-axis; and (d) the pinned magnetization direction of the pinned layer of the seventh and the eighth elements are in a negative direction of the Y-axis ((Figures 10 and 11) and (Page 13, Lines 10-20)).

As to Claim 7,

ADELERHOF discloses a plurality of magnetoresistance effect elements (Figure 10), each element including a spin valve film, the film including a free layer, a spacer layer, and a pinned layer having a pinned magnetization direction, the layers are successively laminated on a substrate of a chip, wherein the element has a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer: (a) the magnetic sensor is formed from magnetoresistance effect elements that are laminated directly on a single substrate on a single chip; (b) an X-axis group of the magnetoresistance effect elements constructing a X-axis magnetic sensor for detecting a magnetic field in an X-axis direction (elements along the 0 degree axis of the right bridge of Figure 10); and (c) a Y-axis group of the magnetoresistance effect elements constructing a Y-axis magnetic sensor for detecting a magnetic field in an Y-axis direction perpendicular to the X-axis (elements along the 90 degree axis of the right bridge of Figure 10) ((Figures 5 and 10) and ((Page 1, Lines 9-29) and (Page 2, Lines 1-8) and (note Applicant's Specification, Page 1, Lines 20-28) and (Page 5, Lines 23-29) and (Page 13, Lines 10-20) and (Page 20, Lines 1-2)).

Note that the Examiner is interpreting the 0 degree axis to be the X-axis and the 90 degree axis to be the Y-axis.

As to Claim 8

ADELERHOF discloses (a) the X-axis group of magnetoresistance effect elements construct the X-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the X-axis group of magnetoresistance effect elements are

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in the X-axis direction; and (b) the Y-axis group of magnetoresistance effect elements construct the Y-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the Y-axis group of magnetoresistance effect elements are in the Y-axis direction (Figure 10).

Note that elements of the X-axis and the elements of the Y-axis are connected to form a double Wheatstone Bridge (Page 13, Lines 10-20).

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



David Schindler
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Art Unit 2862

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